

AMENDMENTS TO THE CLAIMS

Please amend the claims as follows:

1. (Currently Amended) A nitride semiconductor comprising:

a substrate;

a GaN-based buffer layer formed on the substrate ~~in any one selected from a group consisting of,~~ wherein said GaN-based buffer layer is a three-layered structure

$\text{Al}_y\text{In}_x\text{Ga}_{1-(x+y)}\text{N}/\text{In}_x\text{Ga}_{1-x}\text{N}/\text{GaN}$, where $0 < x \leq 1$ and $0 \leq y \leq 1$, ~~and a superlattice structure of $\text{In}_x\text{Ga}_{1-x}\text{N}/\text{GaN}$ where $0 < x \leq 1$; and~~

a GaN-based single crystalline layer formed on the GaN-based buffer layer.

2. (Original) The nitride semiconductor of claim 1, wherein the GaN-based single crystalline layer comprises:

an indium-doped GaN layer;

an undoped GaN layer formed on the Indium-doped GaN layer; and

a silicon-doped n-GaN layer formed on the undoped GaN layer.

3. (Original) The nitride semiconductor of claim 1, wherein the GaN-based single crystalline layer comprises:

an undoped GaN layer;

an indium-doped GaN layer formed on the undoped GaN layer; and

a silicon-doped n-GaN layer formed on the indium-doped GaN layer.

4. (Currently Amended) A nitride semiconductor light emitting device comprising:
a substrate;

a GaN-based buffer layer formed on the substrate ~~in any one selected from a group consisting of,~~ wherein said GaN-based buffer layer is a three-layered structure

$\text{Al}_y\text{In}_x\text{Ga}_{1-(x+y)}\text{N}/\text{In}_x\text{Ga}_{1-x}\text{N}/\text{GaN}$, where $0 < x \leq 1$ and $0 \leq y \leq 1$, ~~and a superlattice structure of $\text{In}_x\text{Ga}_{1-x}\text{N}/\text{GaN}$ where $0 < x \leq 1$; and~~

a first electrode layer of an n-GaN layer formed on the GaN-based buffer layer;

an activation layer formed on the first electrode layer; and

a second electrode layer of a p-GaN layer formed on the activation layer.

5. (Original) The nitride semiconductor light emitting device of claim 4, further comprising:

an Indium-doped GaN layer formed on the GaN-based buffer layer; and

an undoped GaN layer formed on the Indium-doped GaN layer.

6. (Original) The nitride semiconductor light emitting device of claim 4, further comprising:

an undoped GaN layer formed on the GaN-based buffer layer; and

an Indium-doped GaN layer formed on the undoped GaN layer.

7. (Currently Amended) A method for fabricating a nitride semiconductor, the method comprising the steps of:

(a) growing a GaN-based buffer layer on a substrate, wherein said GaN-based buffer layer is in any one selected from a group consisting of a three-layered structure $\text{Al}_y\text{In}_x\text{Ga}_{1-(x+y)}\text{N}/\text{In}_x\text{Ga}_{1-x}\text{N}/\text{GaN}$, where $0 < x \leq 1$ and $0 \leq y \leq 1$, and a superlattice structure of $\text{In}_x\text{Ga}_{1-x}\text{N}/\text{GaN}$ where $0 < x \leq 1$; and

(b) growing a GaN-based single crystalline layer on the grown GaN-based buffer layer.

8. (Previously Presented) A method for fabricating a nitride semiconductor, the method comprising the steps of:

(a) growing a GaN-based buffer layer on a substrate in any one selected from a group consisting of a three-layered structure $\text{Al}_y\text{In}_x\text{Ga}_{1-(x+y)}\text{N}/\text{In}_x\text{Ga}_{1-x}\text{N}/\text{GaN}$ where $0 < x \leq 1$ and $0 \leq y \leq 1$, a two-layered structure $\text{In}_x\text{Ga}_{1-x}\text{N}/\text{GaN}$ where $0 < x \leq 1$, and a superlattice structure of $\text{In}_x\text{Ga}_{1-x}\text{N}/\text{GaN}$ where $0 < x \leq 1$; and

(b) growing a GaN-based single crystalline layer on the grown GaN-based buffer layer, wherein the GaN-based buffer layer is grown in an MOCVD equipment at a temperature of 500 – 800 °C and in a thickness of 50 – 800 Å by introducing sources of TMGa, TMIn and TMAI and a gas of NH_3 at the same time while supplying carrier gases of H_2 and N_2 .

9. (Previously Presented) The method of claim 8, wherein the GaN-based buffer layer is grown under a condition that flow of the sources of TMGa, TMIn and TMAI is 5 – 300 $\mu\text{mol}/\text{min}$ and growing pressure is 100 – 700 torr.

10. (Original) The method of claim 7, wherein the step (b) comprises the steps of:
growing an Indium-doped GaN layer;
growing an undoped GaN layer on the Indium-doped GaN layer; and
growing a silicon-doped n-GaN layer on the undoped GaN layer.

11. (Original) The method of claim 7, wherein the step (b) comprises the steps of:
growing an undoped GaN layer;
growing an Indium-doped GaN layer on the undoped GaN layer; and
growing a silicon-doped n-GaN layer on the Indium-doped GaN layer.

12. (Previously Presented) A nitride semiconductor comprising:
a substrate;
a GaN-based buffer layer formed on the substrate in any one selected from a group consisting of a three-layered structure $\text{Al}_y\text{In}_x\text{Ga}_{1-(x+y)}\text{N}/\text{In}_x\text{Ga}_{1-x}\text{N}/\text{GaN}$ where $0 < x \leq 1$ and $0 \leq y \leq 1$, a two-layered structure $\text{In}_x\text{Ga}_{1-x}\text{N}/\text{GaN}$ where $0 < x \leq 1$, and a superlattice structure of $\text{In}_x\text{Ga}_{1-x}\text{N}/\text{GaN}$ where $0 < x \leq 1$; and
a GaN-based single crystalline layer formed on the GaN-based buffer layer,
wherein the GaN-based buffer layer is grown in an MOCVD equipment at a temperature of 500 – 800 °C and in a thickness of 50 – 800 Å by introducing sources of TMGa, TMIn and TMAI and a gas of NH_3 at the same time while supplying carrier gases of H_2 and N_2 .

13. (Previously Presented) The nitride semiconductor of claim 12, wherein the GaN-based buffer layer is grown under a condition that flow of the sources of TMGa, TMIn and TMAI is 5 – 300 $\mu\text{mol/min}$ and growing pressure is 100 – 700 torr.

14. (Previously Presented) A nitride semiconductor light emitting device comprising:
a substrate;
a GaN-based buffer layer formed on the substrate in any one selected from a group consisting of a three-layered structure $\text{Al}_y\text{In}_x\text{Ga}_{1-(x+y)}\text{N}/\text{In}_x\text{Ga}_{1-x}\text{N}/\text{GaN}$ where $0 < x \leq 1$ and $0 \leq y \leq 1$, a two-layered structure $\text{In}_x\text{Ga}_{1-x}\text{N}/\text{GaN}$ where $0 < x \leq 1$, and a superlattice structure of $\text{In}_x\text{Ga}_{1-x}\text{N}/\text{GaN}$ where $0 < x \leq 1$;
a first electrode layer of an n-GaN layer formed on the GaN-based buffer layer;
an activation layer formed on the first electrode layer; and
a second electrode layer of a p-GaN layer formed on the activation layer,
wherein the GaN-based buffer layer is grown in an MOCVD equipment at a temperature of 500 – 800 °C and in a thickness of 50 – 800 Å by introducing sources of TMGa, TMIn and TMAI and a gas of NH_3 at the same time while supplying carrier gases of H_2 and N_2 .

15. (Previously Presented) The nitride semiconductor light emitting device of claim 14, wherein the GaN-based buffer layer is grown under a condition that flow of the sources of TMGa, TMIn and TMAI is 5 – 300 $\mu\text{mol/min}$ and growing pressure is 100 – 700 torr.

16. (Currently Amended) A nitride semiconductor comprising:

a substrate;

a GaN-based buffer layer formed on the substrate, wherein said GaN-based buffer layer is in any one selected from a group consisting of a three-layered structure

$\text{Al}_y\text{In}_x\text{Ga}_{1-(x+y)}\text{N}/\text{In}_x\text{Ga}_{1-x}\text{N}/\text{GaN}$, where $0 < x \leq 1$ and $0 \leq y \leq 1$, ~~a two-layered structure $\text{In}_x\text{Ga}_{1-x}\text{N}/\text{GaN}$ where $0 < x \leq 1$, and a superlattice structure of $\text{In}_x\text{Ga}_{1-x}\text{N}/\text{GaN}$ where $0 < x \leq 1$; and~~

a GaN-based single crystalline layer formed on the GaN-based buffer layer,

wherein the GaN-based buffer layer has a thickness of 50-800 Å.

17. (Currently Amended) A nitride semiconductor light emitting device comprising:

a substrate;

a GaN-based buffer layer formed on the substrate, wherein said GaN-based buffer layer is in any one selected from a group consisting of a three-layered structure

$\text{Al}_y\text{In}_x\text{Ga}_{1-(x+y)}\text{N}/\text{In}_x\text{Ga}_{1-x}\text{N}/\text{GaN}$, where $0 < x \leq 1$ and $0 \leq y \leq 1$, ~~a two-layered structure $\text{In}_x\text{Ga}_{1-x}\text{N}/\text{GaN}$ where $0 < x \leq 1$, and a superlattice structure of $\text{In}_x\text{Ga}_{1-x}\text{N}/\text{GaN}$ where $0 < x \leq 1$;~~

a first electrode layer of an n-GaN layer formed on the GaN-based buffer layer;

an activation layer formed on the first electrode layer; and

a second electrode layer of a p-GaN layer formed on the activation layer,

wherein the GaN-based buffer layer has a thickness of 50-800 Å.

18. (Currently Amended) A method for fabricating a nitride semiconductor, the method comprising the steps of:

(a) growing a GaN-based buffer layer on a substrate, wherein said GaN-based buffer layer is in any one selected from a group consisting of a three-layered structure

$\text{Al}_y\text{In}_x\text{Ga}_{1-(x+y)}\text{N}/\text{In}_x\text{Ga}_{1-x}\text{N}/\text{GaN}$, where $0 < x \leq 1$ and $0 \leq y \leq 1$, ~~a two-layered structure $\text{In}_x\text{Ga}_{1-x}\text{N}/\text{GaN}$ where $0 < x \leq 1$, and a superlattice structure of $\text{In}_x\text{Ga}_{1-x}\text{N}/\text{GaN}$ where $0 < x \leq 1$; and~~

(b) growing a GaN-based single crystalline layer on the grown GaN-based buffer layer, wherein the GaN-based buffer layer has a thickness of 50-800 Å.